HIT 'Em Where It Hurts

By LCdr. Steve Morgenfeld

Thirty-foot seas, more than 30 degrees of roll, and more than 100 knots of wind across the flight deck.

Were we stuck in yet another typhoon on this cruise? Well, no. We actually were tucking tail and running in the other direction. After weathering two typhoons over the past month and a half, the ship had no desire to turn the typhoon hat trick. I would have had no problem running north from the typhoon, except we were supposed to be steaming south to Okinawa. We had to return a borrowed helicopter to our sister squadron, HSL-51 Warlords, stationed in Atsugi, Japan. Okinawa rapidly was becoming a dot on the horizon behind us as we escaped to the north.

Fortunately, we had embarked our sister squadron's turnover crew before leaving the area. Rather than turning over the aircraft in Okinawa, our new plan was to turn it over while on the ship.

Two days later, we were scheduled to be just offshore Atsugi. From there, the other crew could conduct a short flyoff, instead of a long cross-country flight home from Okinawa. Our flight from the storm made the aircraft turnover and subsequent ferry flight to Japan much easier. The additional personnel embarked on the ship from our sister squadron meant several trips ashore to transport everyone home. To make the evolution go quicker, once the borrowed helicopter left the deck, we pulled our helicopter out of the hangar and loaded the pax.

The plan was to fly in formation to Atsugi and take a small detour over Yokohama for a quick photo session. Everyone was looking forward to this good-deal flight on the tail end of our six-month deployment. The only glitch was that we were a bit pressed for time because the ship was ready to head east for the transit home to San Diego. To have time for a bit of sightseeing, we would fly faster than usual. We conducted our preflight brief, and, after everyone was comfortable with the evolution, and all hazards were mitigated and well within acceptable limits, we took off.

Once we launched in our det helo, we started our post take-off checks. One of the very last items on the checklist is the health-indicator test, or HIT check. It's a quick test to determine if the engines are providing an acceptable amount of power. Engine turbine-gas temperature (TGT), altitude, and outside-air temperature are all factored into the check. After recording all of the parameters, I was ready to hit the charts and make sure we were within limits when we received a radio call from the other helicopter. Sidetracked, I checked in with them and forgot about the charts.

We rendezvoused with the other helicopter and began our high-speed-formation flight to Atsugi. Along the way, I concentrated on monitoring my young H2P's

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formation-flying skills. The beautiful Japanese coastline and silhouette of Mt. Fuji also kept my mind occupied. After flying for about 20 minutes, it dawned on me that I never had run the numbers from the HIT check.

I opened my checklist and consulted the chart. The operating temperature on our No. 1 engine was one degree outside the approved window. Hmm, one degree—that couldn't be a problem, could it? It even was one degree cooler than it should have been. Who's ever heard of an engine failing because it was running cooler than prescribed? Besides, these HIT checks always are within limits. We probably just wrote down a wrong number or happened to record the TGT when it momentarily was in flux. At any rate, even if the HIT check is out of limits, the NATOPS procedures only state that a VIDS/MAF should be created after completing the flight. NATOPS doesn't give any guidance on landing criteria or extended flight. I figured after we dropped off our pax in Atsugi and were transiting home, we'd do another HIT check on the No. 1 engine. I was confident it would be within limits.

Our flight to Atsugi went without a hitch. The trip through Yokohama en route to the base was well worth the high speed of our formation flight. After we bid farewell to our friends, we started our transit back to mom. En route, we recalculated the HIT check on the No.1 engine; it still was out of limits, not by much, but definitely still out. We tried a third time with the same results. We had no other secondary indications of problems in the cockpit, and we rapidly were approaching the ship.

"OK," I thought, "I'll write up the VIDS/MAF after shutdown, and maintenance will take a look at the engine. It's probably just an air leak or something, not serious. They'll probably just have us do an extra engine wash and try the HIT check again."

We landed without incident. I wrote up the gripe and went inside for movie night.

The next morning, I received a call from our det maintenance chief. "Sir, do you have a minute? I'd like to show you something," he said.

I wandered down to the hangar to find all our ADs huddled around the aircraft—never a good sign.

"We checked out the No. 1 engine after you landed last night. I can't believe it didn't fail on you," the chief said.

I only could muster a faint, "What?"

The chief turned the radial drive shaft—the shaft that powers the engine's auxiliary gearbox. It sounded like he was shaking a silverware drawer. Obviously, the gears inside were eating themselves. He then pulled out the drive shaft and showed it to me. Aside from the damage to the gears, the shaft had two separate areas that were significantly chafed. I started to get a sinking feeling in my stomach, a feeling that probably should have been there that afternoon, while I still was in the aircraft.

This episode raised quite a few questions in my mind. Was the performance of the engine on the HIT check truly indicative of impending failure, or was it just coincidence? The engine was, after all, only out of limits by one degree on the cool side. Should I immediately have brought the aircraft back after realizing we were out of limits? NATOPS doesn't require it. If this happened to me again under similar circumstances, how would I react? Did I let myself get distracted from the checklist and feel rushed to keep up with the other helicopter? That's obviously the case.

So, what did I learn? First, the "rush" we felt to get our pax on shore and return to the ship never should have interrupted my checklist. The perceived pressure we felt almost was entirely self-inflicted. There was no excuse for not completing all checklist items before continuing on with the flight. Second, the HIT-check procedures probably need revamping. Because the checklist doesn't call for a landing as soon as practicable after a failed HIT check creates the impression the situation isn't particularly grave. That may be the case in most situations, but we proved differently. Was the HIT check telling me the engine was self-destructing? Until we get the results back from the engineering investigation, we won't know for sure. It would be an incredible coincidence if the engine just decided to chew itself up at the same time we randomly failed a HIT check. Dismissing failure indicators as pure coincidence is a surefire way of getting yourself in trouble.

Fortunately, we got back on board. The engine was changed, and we were back in the flying business the next day. Our flight easily could have turned out differently. If the engine had failed in flight, at the very least, we would have gotten to "tour" a civilian Japanese airport as we diverted to a one-engine landing. At worst, we could have had a tragic end to our "good deal" flight with a full load of passengers on board.

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The strength of this sea story is the identification of perceived pressure to get the job done right now, as briefed. But perceived pressure, as this aviator points out, does not always come from the belief those higher in the food chain expect everyone to get whatever is scheduled or directed done—right now, as briefed. More times than not, we do it to ourselves. Evaluating the mission, following procedures, and responding to abnormalities in ways that allow us to bring the aircraft and our crew or passengers back safely is what we are paid to do—it is the professional thing to do. Next time something is NQR (not quite right), sit back and ask, "Is the pressure I feel to get the job done now, coming from outside or inside of my flight helmet?"—Capt. Ken Neubauer, Director, Aviation Safety Programs, Naval Safety Center.